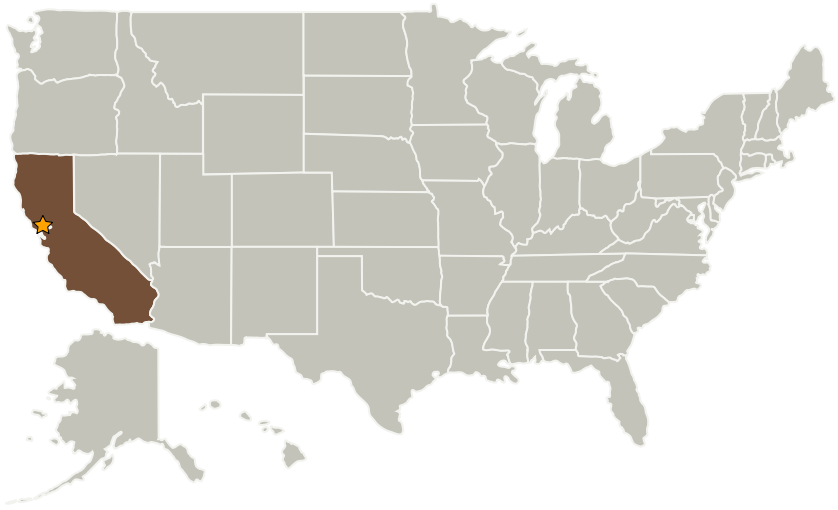
Nitrous Oxide Liquid Injection Thrust Vector Control System Testing, Phase II

Completed Technology Project (2009 - 2010)

Project Introduction

A Nitrous Oxide-fed Liquid Thrust Vector Control system is proposed as an efficient method for vehicle attitude control during powered flight. Pulled from a N2O main propulsion system oxidizer tank, it features system simplicity, no toxicity, room temperature storability, high system mass fraction and superior performance due to its exothermic decomposition characteristics, answering the need for innovative attitude control technologies. A continuing series of 1,000 lb thrust hybrid rocket motor tests are proposed to characterize N2O's Side Specific Impulse as a function of thrust vectoring angle, as well as a series of 4,000 lb thrust motor firings culminating in a closed-loop Guidance Navigation and Control Hardware-In-The-Loop test in a vertical stand. At the conclusion of Phase 2, the technology will be ready for development into an upper stage as an integrated main propulsion Thrust Vector Control (TVC) /Attitude Control System for a small launch vehicle, or as a separate TVC system for any solid, liquid or hybrid powered vehicle.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California
Whittinghill Aerospace, LLC	Supporting Organization	Industry	Camarillo, California

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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Ames Research Center (ARC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Primary U.S. Work Locations
California

Project Transitions

March 2009: Project Start

December 2010: Closed out

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX01 Propulsion Systems
  - TX01.1 Chemical Space Propulsion
    - TX01.1.5 Hybrids